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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/829,212	04/22/2004	Takashi Iwamoto	403049	5541

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EXAMINER
CHAPMAN JR, JOHN E

ART UNIT	PAPER NUMBER
2856	

DATE MAILED: 10/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/829,212	IWAMOTO ET AL.
	Examiner	Art Unit
	John E. Chapman	2856

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All b)☐ Some * c)☐ None of:

        1.☒ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>4/22/04</u>.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1.   35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear,

concise, and exact terms." The specification is replete with terms which are not clear, concise

and exact. The specification should be revised carefully in order to comply with 35 U.S.C. 112,

first paragraph. Examples of some unclear, inexact or verbose terms used in the specification

are:

>   The sentence on page 2, lines 5-8, is unclear.

>   The sentence beginning on page 3, last line, is unclear.

>   The sentence on page 4, lines 6-12, is unclear.

>   Page 9, line 9, "short term" should be --fast--.

2.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making
> and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it
> pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode
> contemplated by the inventor of carrying out his invention.

3.   Claims 1-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with

the enablement requirement. The claim(s) contains subject matter which was not described in

the specification in such a way as to enable one skilled in the art to which it pertains, or with

which it is most nearly connected, to make and/or use the invention.

It is not clear how to set time intervals and sample current values of the ion currents in

the respective time intervals in order to determine the time-frequency components thereof.

According to the specification on page 8, lines 18-22, "the time-frequency transforming means 3

determines the time-frequency components Cn(f) in the time intervals from the ion current

sampled values included in the time intervals In = (Tn, Tn+ΔT, ..., Tn+(M-1)ΔT) that are set

allowing overlap determined by the detection control means 5." However, it is not clear what

"n" is, what "In" is, what "Tn" is, what "ΔT" is, what "M" is, and what the time intervals are.

Note that (Tn, Tn+ΔT, ... , Tn+(M-1)ΔT) is a <u>series</u> and not an <u>interval</u>. What the series has to

do with time intervals is not clear. Assuming that "In" is the n-th time interval and "M" is the

total number of intervals, i.e. 5 in Fig. 3, then the zeroth interval I_0 would be I_0 = (T$_0$, T$_0$+ΔT, ...,

T$_0$+4ΔT). But it appears from Fig. 3 that I_0 = (T$_0$, T$_0$+ΔT), where "T$_0$" is the initial time and

"ΔT" is the length of "Interval 0" in Fig. 3. What significance the other terms in the I_0 series

have is unclear. Similarly, the first interval I_1 would be I_1 = (T$_1$, T$_1$+ΔT, ..., T$_1$+4ΔT). But it

appears from Fig. 3 that I_1 = (T$_0$+½ΔT, T$_0$+^{3}/$_2$ ΔT). How these I_1 equations are consistent is far

from evident.

Applicant goes on to state on page 9, lines 4-6, "In the present embodiment, an example

is described where M = 256 and T$_{n+1}$ = T$_n$+(M/K)ΔT (where K = 8 and n = 0, 1, 2, ...). However,

applicant fails to identify what "M" signifies, what "K" signifies, and what "n" signifies.

Furthermore, it would appear that <u>by definition</u> ΔT= T$_{n+1}$ - T$_n$. Hence, the equation on page 9,

line 5, appears to be inconsistent with the common definition of "ΔT".

On page 9, lines 9-10, it is not clear what is meant by "a Hanning window W(m) of an

order M." It is not clear whether the "order M" of the Hanning window is the same as the "M"

in the time intervals "In" on page 8, line 21, and page 9, line 5.

On page 9, equation 2, it is not clear what "Tn" is, what "ΔT" is, and what "M" is.

Furthermore, it is noted that "x" increases by "ΔT" in the sequence in equation 2, whereas it

increases by "Δt" in the sampled values on page 8, line 13. It is not clear whether "ΔT" is the same as, or different from, "Δt".

On page 10, line 9-10, it is not clear what it means for "the logical expression f(x)" to "become the true value."

On page 12, line 1, it is not clear why the "standard factor C" is not a function of "n", since "Cn(f) is a function of both "n" and "f". While dependency upon "f" is eliminated by summation over "f", it is not clear how the dependency upon "n" is eliminated. It would appear that "C" should be --Cn-- on the left hand side of equation 4.

On page 12, it is not clear what is meant by "the above-described resolution principle" in line 14. What "resolution principle"?

On page 13, it is not clear how the window function of equation 6 is used to obtain "a Gabor wavelet component." It is not clear what is meant by "a Gabor wavelet component." Applicant neither defines the term nor incorporates by reference an article that defines the term. In addition, the specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to determine what other window functions could be used to obtain a "wavelet transform," as recited in claims 3 and 9 Accordingly, the invention is not commensurate in scope with the claims.

In addition, it is not clear what "L" is in equation 6. While the applicant gives one example for L on page 13, line 19, applicant never defines "L" in general.

4.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5.   Claims 1, 2, 4, 7, 8, 10 and 11, as best understood, are rejected under 35 U.S.C. 102(b) as

being anticipated by Frankowski et al.

Frankowski et al. disclose a knock detection method and apparatus comprising a flame

ionization sensor (column 4, line 57), a time-frequency transforming means 109 (column 6, line

20), a knock detecting means (column 4, lines 44-47), and a means for inputting a running status

(engine angular displacement). The time-frequency transforming means 109 sets time intervals

205 and 215 in Fig. 2 having overlapping data sets (column 11, lines 41-47).

Regarding claims 5 and 11, the means for inputting a running status (engine angular

position) changes the sampled times dependent on engine speed, since the time interval of the

crank angle window 205 will change with engine speed.

6.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7.   Claims 6 and 12, as best understood, are rejected under 35 U.S.C. 103(a) as being

unpatentable over Frankowski et al.

The only difference between the claimed invention and the prior art appears to consist in dividing a knock determination equation by a "standard factor." Frankowski et al. disclose a knock determination equation comprising the sum of Bessel function coefficients and compare the sum with a scaled, time-weighted version 909 in Fig. 9. It would have been an obvious mathematical equivalent to divide the sum of Bessel function coefficients by a time-weighted version and compare the ratio with a predetermined threshold (i.e., the scale factor). A time-weighted version 909 comprises a "standard factor" in that it is used for standardization. Alternatively, a non-knock variable (column 10, line 43) comprises a "standard factor."

8.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ichihara et al. discloses a method and apparatus for detecting knock in an internal combustion engine comprising overlapping ranges of crank angles in which a signal is picked up. See Fig. 1(a) and Fig. 2(b).

9.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to John E. Chapman whose telephone number is (571) 272-2191. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (571) 272-2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).
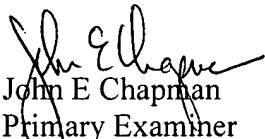
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